

CLAIMS

1. A recording medium having a main data area that is a write-once recordable section in which data is writable once,
5 and a management/control area in which management/control information for recording and playing back data on the main data area is recorded,

wherein the main data area includes:

10 a normal record and playback sub-area in which data is recorded and played back;

a rewriting replacement sub-area into which rewritten data is recorded in response to a request to rewrite the data recorded in the normal record and playback sub-area; and

15 a replacement management sub-area in which replacement management information between the data that is to be updated in the normal record and playback sub-area according to a rewrite request and the rewritten data that is recorded in the rewriting replacement sub-area in
20 response to the rewrite request is recorded.

2. A recording medium according to claim 1, wherein the sizes of the rewriting replacement sub-area and the replacement management sub-area are defined by the management/control information recorded in the
25 management/control area.

3. A recording medium according to claim 1, wherein the management/control information recorded in the management/control area includes information indicating whether or not the rewriting replacement sub-area and the replacement management sub-area are available.

4. A recording medium according to claim 1, wherein the management/control area is a write-once recordable section in which data is writable once, and includes a management/control-information replacement sub-area for updating the management/control information for the rewriting replacement sub-area and the replacement management sub-area.

5. A recording apparatus for a recording medium having a write-once recordable section in which data is writable once, the write-once recordable section including a main data area and a management/control area in which management/control information for recording and playing back data on the main data area is recorded, said recording apparatus comprising:

writing means for writing data; and

formatting control means for causing the writing means to record the management/control information in the management/control area so as to form in the main data area:

a normal record and playback sub-area in which data is recorded and played back;

a rewriting replacement sub-area into which

rewritten data is recorded in response to a request to rewrite the data recorded in the normal record and playback sub-area; and

a replacement management sub-area in which

5 replacement management information between the data that is to be updated in the normal record and playback sub-area according to a rewrite request and the rewritten data that is recorded in the rewriting replacement sub-area in response to the rewrite request is recorded.

10 6. A recording apparatus for a recording medium having a main data area that is a write-once recordable section in which data is writable once, and a management/control area in which management/control information for recording and playing back data on the main data area is recorded, the
15 main data area including a normal record and playback sub-area in which data is recorded and played back, a rewriting replacement sub-area into which rewritten data is recorded in response to a request to rewrite the data recorded in the normal record and playback sub-area, and a replacement
20 management sub-area in which replacement management information between the data that is to be updated in the normal record and playback sub-area according to a rewrite request and the rewritten data that is recorded in the rewriting replacement sub-area in response to the rewrite
25 request is recorded, said recording apparatus comprising:

writing means for writing data;

confirming means for, upon a request to write data to the main data area, confirming whether or not the address specified by the write request is an address at which data

5 has been recorded;

determining means for, when the confirming means confirms that the address is an address at which data has been recorded, determining whether or not the data is rewritable and recordable using the rewriting replacement

10 sub-area and the placement management sub-area; and

write control means for, when the confirming means confirms that the address specified by the write request is an address at which no data has been recorded, controlling the writing means so as to write the data to the address

15 specified by the write request, and, when the confirming means confirms that the address specified by the write request is an address at which data has been recorded and

when the determining means determines that the data is rewritable and recordable, controlling the writing means so

20 as to write the data in accordance with the write request to the rewriting replacement sub-area while recording the replacement management information into the replacement management sub-area.

7. A playback apparatus for a recording medium having a

25 main data area that is a write-once recordable section in

which data is writable once, and a management/control area in which management/control information for recording and playing back data on the main data area is recorded, the main data area including a normal record and playback sub-
5 area in which data is recorded and played back, a rewriting replacement sub-area into which rewritten data is recorded in response to a request to rewrite the data recorded in the normal record and playback sub-area, and a replacement management sub-area in which replacement management
10 information between the data that is to be updated in the normal record and playback sub-area according to a rewrite request and the rewritten data that is recorded in the rewriting replacement sub-area in response to the rewrite request is recorded, said playback apparatus comprising:
15 reading means for reading data;
 confirming means for, upon a request to read data from the main data sub-area, confirming whether or not the address specified by the read request is an address at which data has been rewritten; and
20 read control means for, when the confirming means confirms that the address specified by the read request is not an address at which data has been rewritten, controlling the reading means so as to read the data from the address specified by the read request, and, when the confirming
25 means confirms that the address specified by the read

request is an address at which data has been rewritten,
controlling the reading means so as to read the data in
accordance with the read request from the rewriting
replacement sub-area based on the replacement management
5 information recorded in the replacement management sub-area.

8. A recording method for recording data onto a recording
medium having a write-once recordable section in which data
is writable once, the write-once recordable section
including a main data area and a management/control area in
10 which management/control information for recording and
playing back data on the main data area is recorded,

wherein the management/control information is recorded
in the management/control area so as to form in the main
data area:

15 a normal record and playback sub-area in which data
is recorded and played back;

a rewriting replacement sub-area into which
rewritten data is recorded in response to a request to
rewrite the data recorded in the normal record and playback
20 sub-area; and

a replacement management sub-area in which
replacement management information between the data that is
to be updated in the normal record and playback sub-area
according to a rewrite request and the rewritten data that
25 is recorded in the rewriting replacement sub-area in

response to the rewrite request is recorded.

9. A recording method for recording data onto a recording medium having a main data area that is a write-once recordable section in which data is writable once, and a management/control area in which management/control information for recording and playing back data on the main data area is recorded, the main data area including a normal record and playback sub-area in which data is recorded and played back, a rewriting replacement sub-area into which rewritten data is recorded in response to a request to rewrite the data recorded in the normal record and playback sub-area, and a replacement management sub-area in which replacement management information between the data that is to be updated in the normal record and playback sub-area according to a rewrite request and the rewritten data that is recorded in the rewriting replacement sub-area in response to the rewrite request is recorded, said recording method comprising:

a confirming step of, upon a request to write data to the main data area, confirming whether or not the address specified by the write request is an address at which data has been recorded;

a determining step of, when it is confirmed in the confirming step that this address is an address at which data has been recorded, determining whether or not the data

is rewritable and recordable using the rewriting replacement sub-area and the replacement management sub-area;

a first writing step of, when it is confirmed in the confirming step that the address specified by the write request is an address at which no data has been recorded, writing the data to the address specified by the write request; and

a second writing step of, when it is confirmed in the confirming step that the address specified by the write request is an address at which data has been recorded and when it is determined in the determining step that the data is rewritable and recordable, writing the data in accordance with the write request to the rewriting replacement sub-area and recording the replacement management information into the replacement management sub-area.

10. A playback method for playing back data on a recording medium having a main data area that is a write-once recordable section in which data is writable once, and a management/control area in which management/control

information for recording and playing back data on the main data area is recorded, the main data area including a normal record and playback sub-area in which data is recorded and played back, a rewriting replacement sub-area into which rewritten data is recorded in response to a request to rewrite the data recorded in the normal record and playback

sub-area, and a replacement management sub-area in which replacement management information between the data that is to be updated in the normal record and playback sub-area according to a rewrite request and the rewritten data that
5 is recorded in the rewriting replacement sub-area in response to the rewrite request is recorded, said playback method comprising:

a confirming step of, upon a request to read data from the main data area, confirming whether or not the address
10 specified by the read request is an address at which data has been rewritten;

a first reading step of, when it is confirmed in the confirming step that the address specified by the read request is not an address at which data has been rewritten,
15 reading data from the address specified by the read request; and

a second reading step of, when it is confirmed in the confirming step that the address specified by the read request is an address at which data has been rewritten,
20 reading the data in accordance with the read request from the rewriting replacement sub-area based on the replacement management information recorded in the replacement management sub-area.